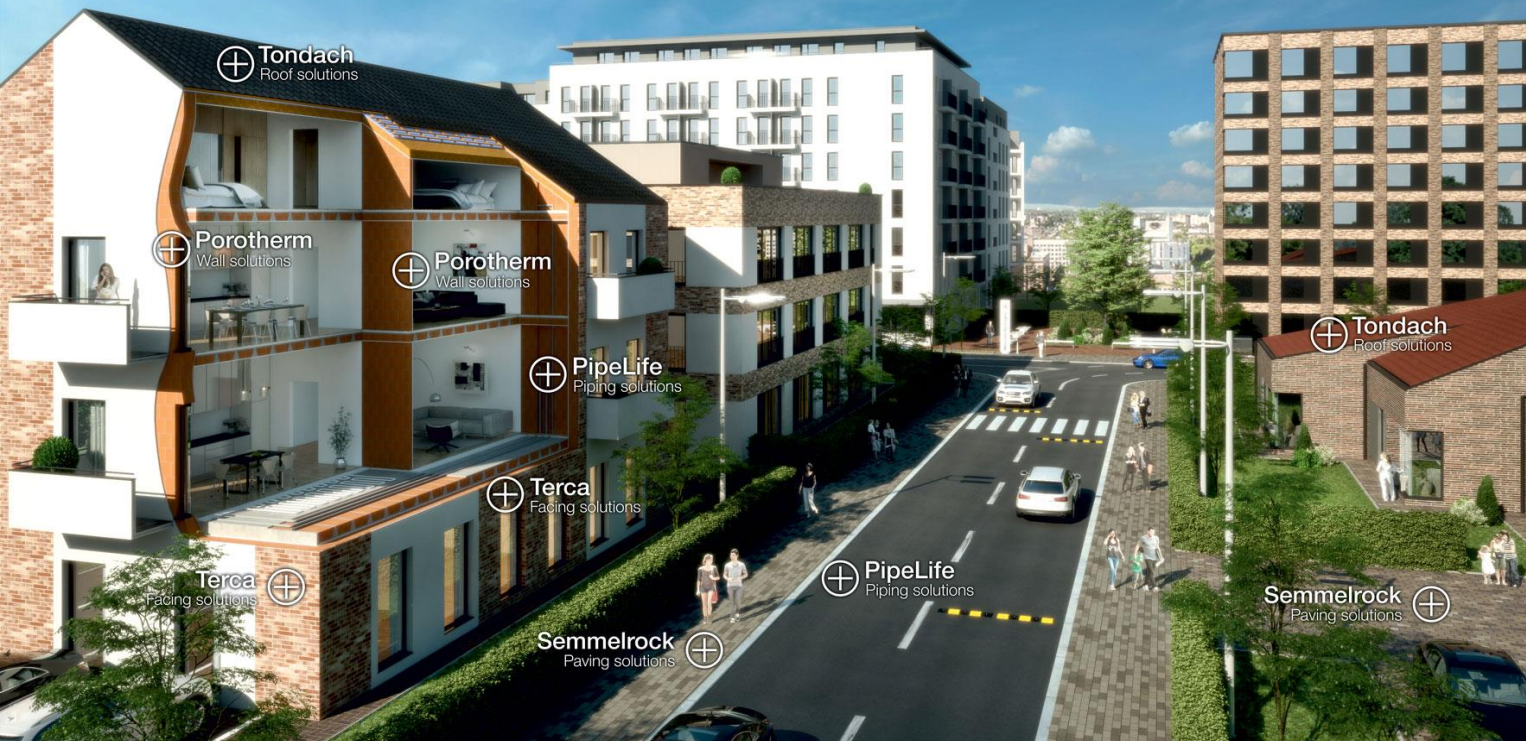


Wienerberger Solutions for all types of buildings



we are wienerberger

PIPELIFE

Semmelrock
stein+design®

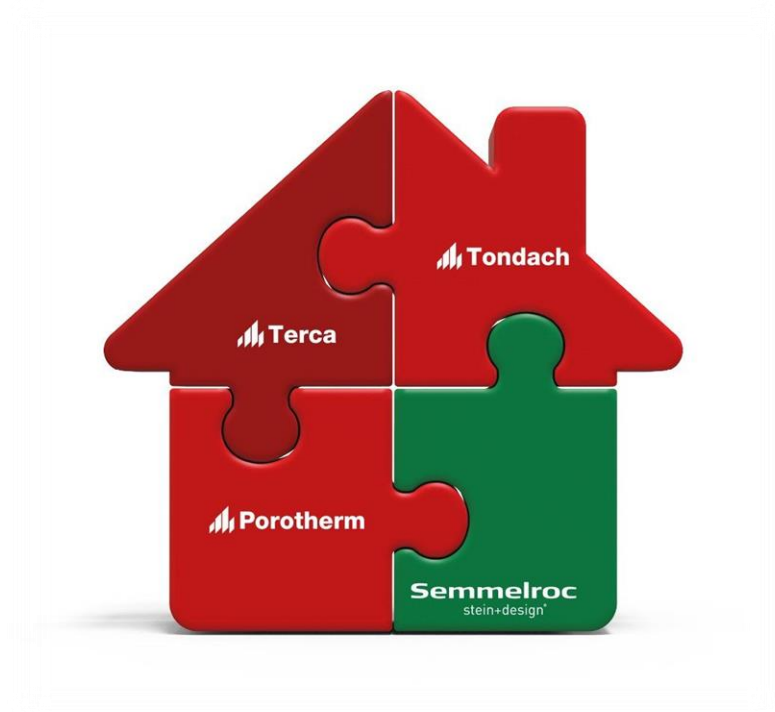
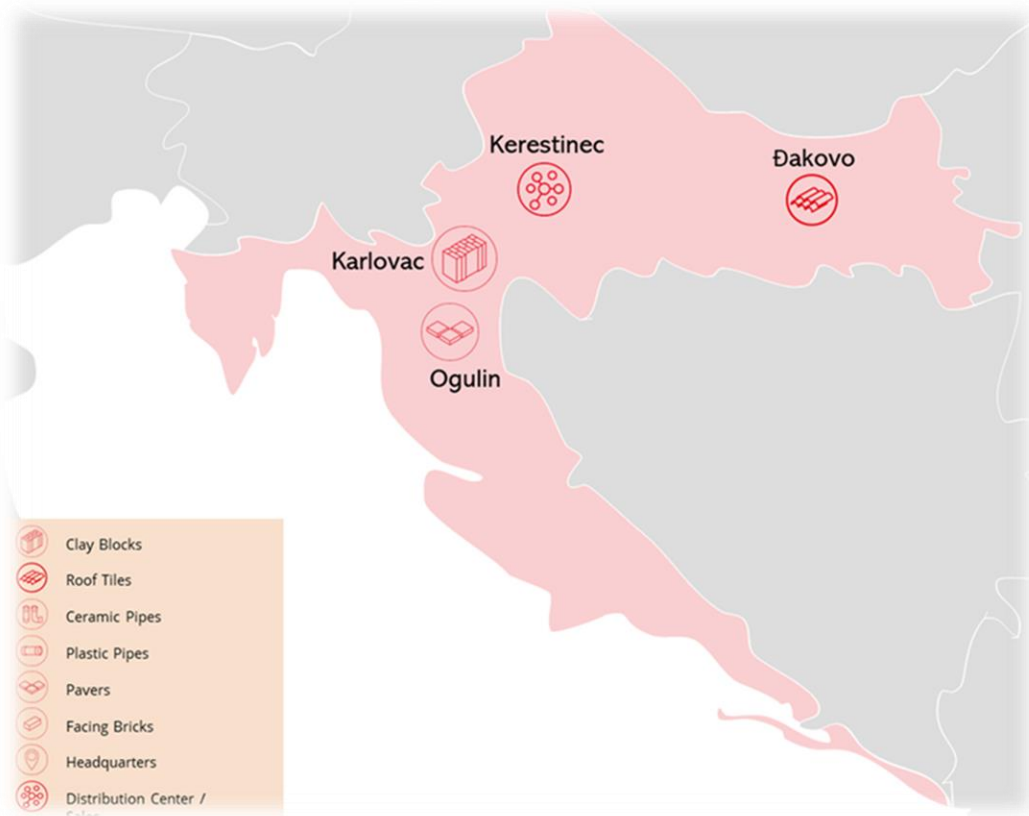
Wienerberger

Wienerberger sustavi gradnje
Josip Klarić, mag. ing. aedif., projektno-tehnički savjetnik

wienerberger
Building Solutions

Wienerberger Hrvatska

wienerberger
Building Solutions



Porotherm zidni sustavi

wienerberger
Building Solutions



Porotherm Profi

wienerberger
Building Solutions



Porotherm Profi

wienerberger

Nekada...

Sada!



Porotherm Profi

wienerberger
Building Solutions



Porotherm 30 Profi



Porotherm 25 Profi



Porotherm 20-50
Profi



Porotherm 11,5
Profi



Porotherm 10 Profi



Porotherm 8 Profi

3x brža gradnja | Jednostavno, suho i čisto.

Normativ rada

Porotherm 30 Profi



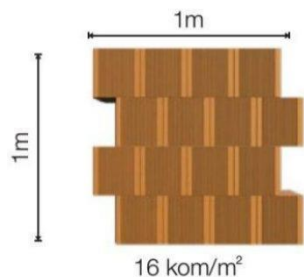
Modul blok 19/29/19



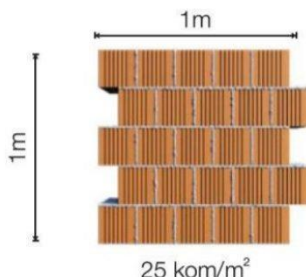
*Normativ koji uključuje zidanje i pripremu morta.

Normativ materijala

Porotherm 30 Profi



Modul blok 19/29/19



wienerberger

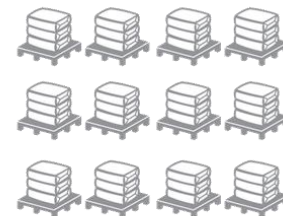
70

Kamiona
morta

=

1

Kamion
Dryfix.extra



10 000 litara
morta



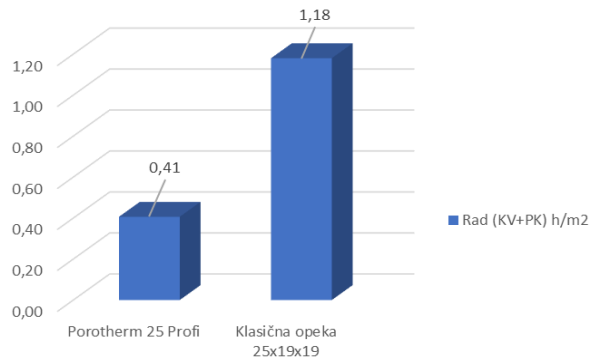
30 boca
Dryfix.extra

3x brža gradnja | Jednostavno, suho i čisto.

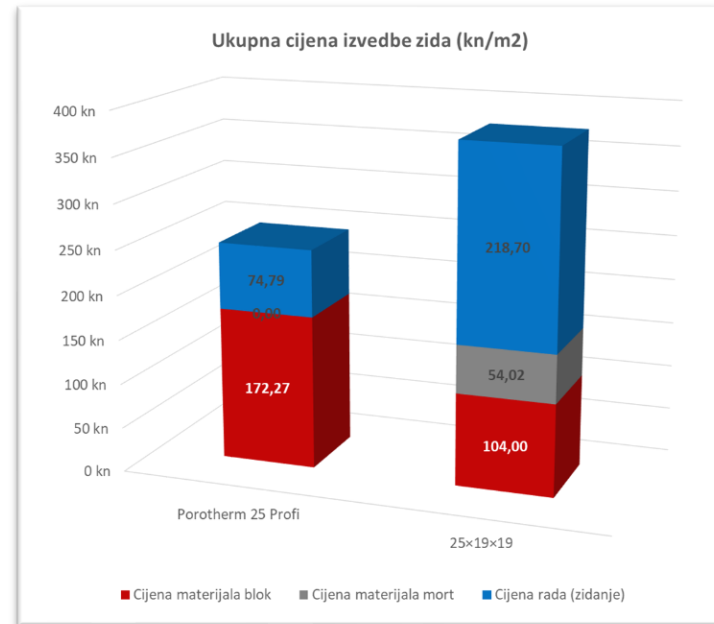
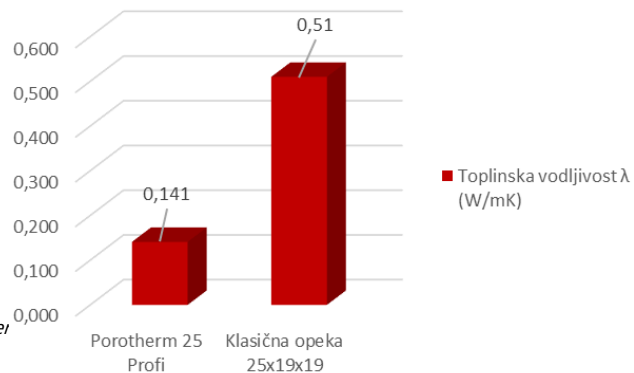
wienerberger



Vrijeme potrebno za izvedbu (h/m²)



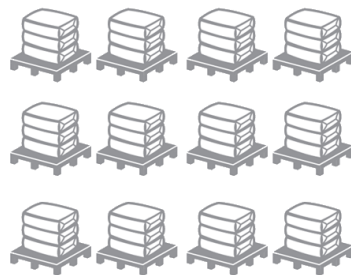
Usporedba toplinske vodljivosti λ



Izvor: Mjerenje i normiranje rada: Zidanje Wienerberger Porotherm 30 Profi, Građevinski fakultet, Sveučilište u Zagrebu, 2019.

Porotherm Profi sustav

- ✓ 3x brža gradnja / Bez morta
- ✓ Manji broj radnika na gradilištu
- ✓ Jednostavnija logistika
- ✓ Iznimno ravne površine zidova



10 000 litara
morta

wienerberger



30 boca
Dryfix.extra



Omeđeno zide - sistemska rješenja

wienerberger

> Porotherm kutovi **za potresno otpornu gradnju**



- ✓ Omeđeno zide po HRN EN 1998-1
- ✓ Brza, jednostavna i precizna gradnja
- ✓ Bez dodatnih oplata
- ✓ Učinkovito spriječen toplinski most
- ✓ Uporaba i za instalacijske kanale

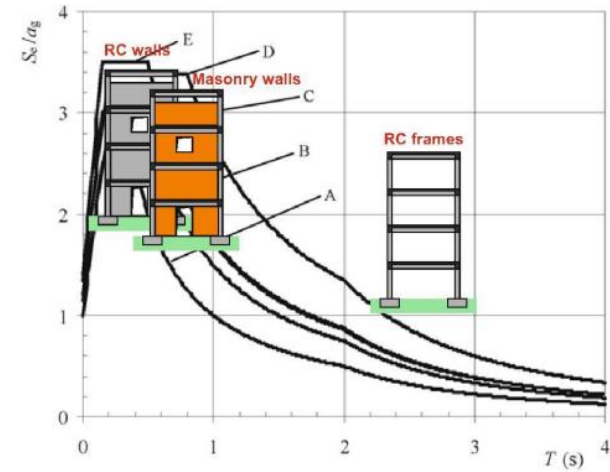


Omeđeno ziđe - sistemska rješenja

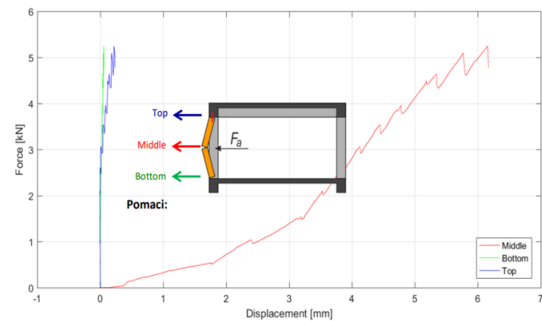
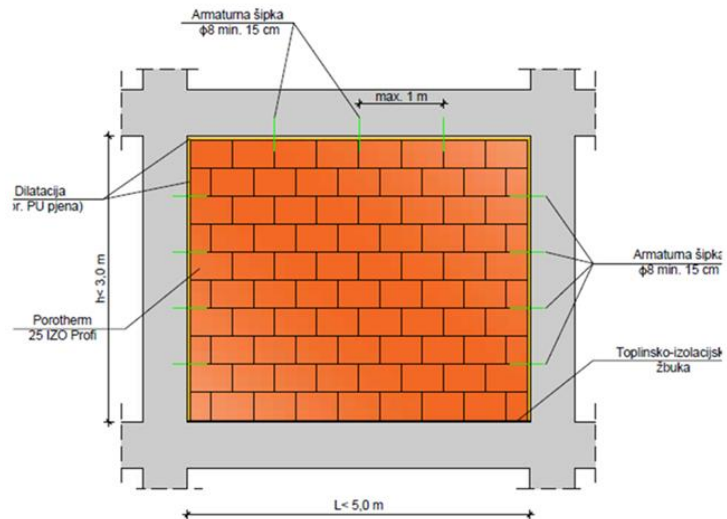


Ispunsko ziđe - dokazana potresna otpornost

- » Ispitivanja otpornosti ispune izvan ravnine / FGAG Split
- » Ciklička ispitivanja na potresnoj platformi / ZAG Ljubljana
- » Ciklička ispitivanja IGH Zagreb

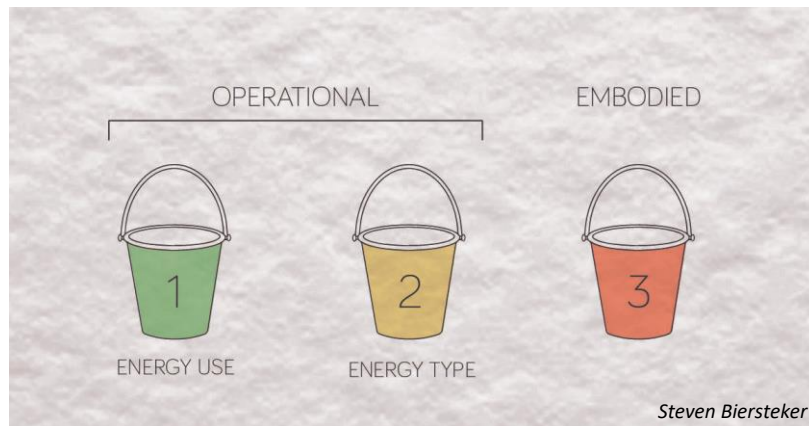
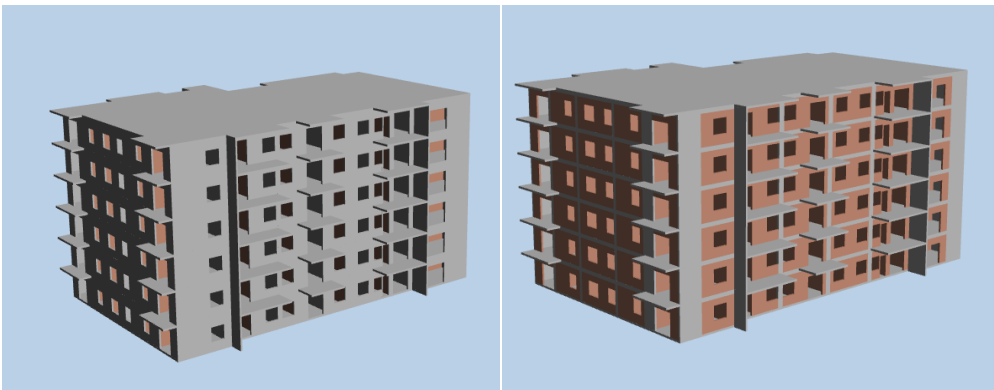


Ispunsko zide - dokazana potresna otpornost

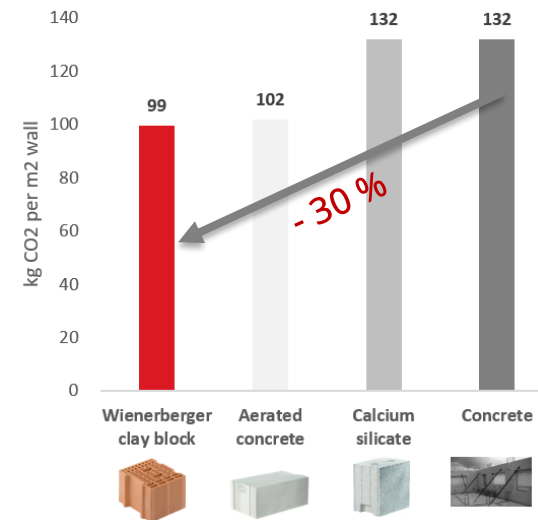


CO₂ emisije | Life Cycle Assessment

- » Potrošnja energije u zgradama znatno smanjena tijekom proteklih godina
- » Izbor materijala i proces gradnje sve više u fokusu za uštede CO₂



GWP of ETICS walls | Cradle-to-Cradle





EPD | Prvi korak ka održivom projektiranju.

- » EPD – Izjava o utjecaju na okoliš
 - » Informacije o utjecaju građevnog proizvoda na okoliš tijekom njegovog životnog ciklusa
 - » Neovisno provjereni podaci
- » Osnova za LEED, DGNB, BREEAM certificiranje

Core indicator	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ eq.]	1,14E+02	6,40E+00	6,69E+00	0,00E+00	7,23E-01	6,20E-01	2,72E+00	8,56E-01	-2,28E+01
GWP-fossil	[kg CO ₂ eq.]	1,13E+02	6,42E+00	5,73E+00	0,00E+00	7,57E-01	6,22E-01	2,70E+00	8,79E-01	-2,04E+01
GWP-biogenic	[kg CO ₂ eq.]	9,08E-01	-6,30E-02	9,60E-01	0,00E+00	-3,90E-02	-6,10E-03	6,61E-03	-2,61E-02	-2,80E+00
GWP-luluc	[kg CO ₂ eq.]	4,21E-02	4,34E-02	2,01E-03	0,00E+00	4,91E-03	4,21E-03	8,25E-03	1,63E-03	3,36E-01
ODP	[kg CFC 11 eq.]	1,13E-10	6,33E-13	4,35E-12	0,00E+00	7,16E-14	6,13E-14	7,31E-12	2,09E-12	-1,23E-10
AP	[mol H ⁺ eq.]	1,87E-01	2,07E-02	6,84E-03	0,00E+00	3,67E-03	2,00E-03	1,33E-02	6,25E-03	-7,49E-02
EP-freshwater	[kg PO ₄ eq.]	5,95E-05	2,30E-05	2,41E-06	0,00E+00	2,60E-06	2,23E-06	6,20E-06	1,50E-06	6,52E-05
EP-marine	[kg N eq.]	4,13E-02	9,42E-03	1,60E-03	0,00E+00	1,71E-03	9,12E-04	6,20E-03	1,60E-03	-5,92E-03
EP-terrestrial	[kg N eq.]	4,53E-01	1,06E-01	1,85E-02	0,00E+00	1,90E-02	1,02E-02	6,84E-02	1,75E-02	-3,58E-02
POCP	[kg NMVOC eq.]	1,30E-01	1,86E-02	4,84E-03	0,00E+00	4,80E-03	1,80E-03	1,67E-02	4,85E-03	-1,38E-02
APD-minerals & metals	[kg Sb eq.]	1,25E-05	6,50E-07	4,32E-07	0,00E+00	7,35E-08	6,29E-08	3,07E-06	9,09E-08	8,53E-07
APD-fossil	[MJ]	1,73E+03	8,46E+01	5,83E+01	0,00E+00	9,57E+00	8,20E+00	5,12E+01	1,15E+01	1,82E+02
WDP	[m ³ world eq. extraced]	8,16E-01	7,21E-02	3,06E-01	0,00E+00	7,66E-04	6,99E-03	4,59E-01	9,62E-02	-3,67E-01



Already best in class in GWP

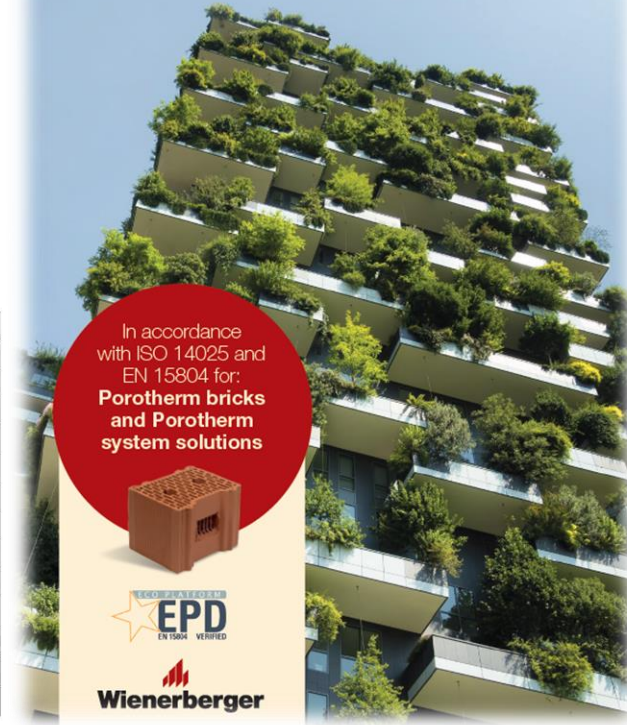


Long lifetime up to 150 years



Huge recycling potential

EPD | ENVIRONMENTAL PRODUCT DECLARATION



In accordance with ISO 14025 and EN 15804 for:
Porotherm bricks and Porotherm system solutions



Wienerberger

Porotherm IZO Profi

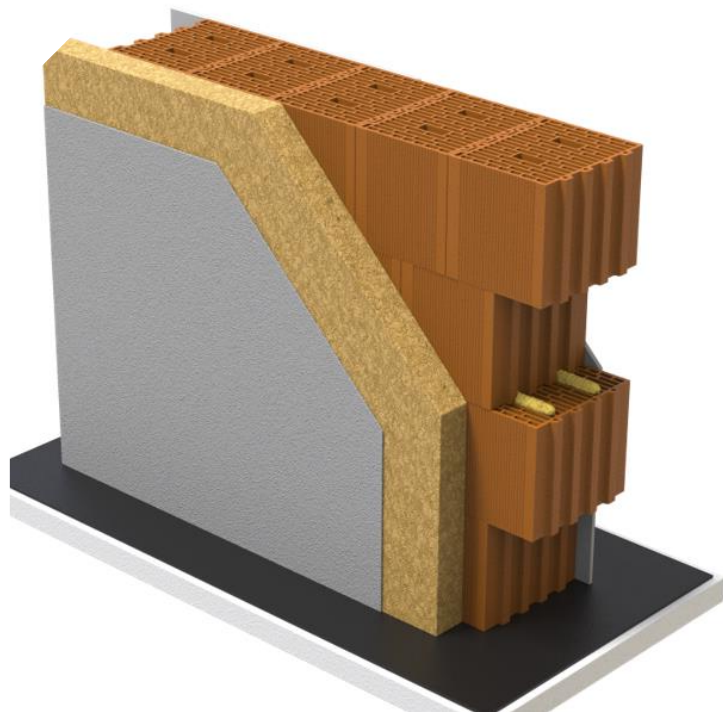
wienerberger
Building Solutions



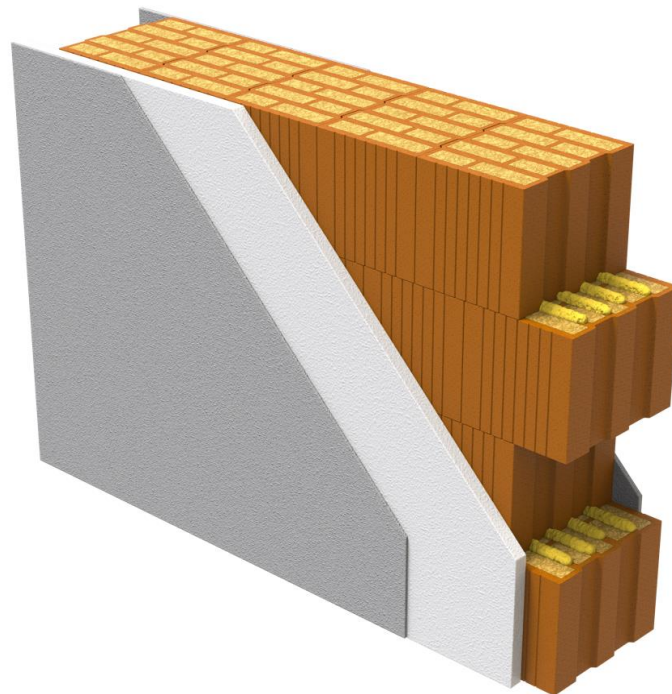
Porotherm IZO Profi

wienerberger

Standardni zid...



IZO Profi zid!



Porotherm IZO Profi

wienerberger
Building Solutions



**Porotherm 50 IZO
Profi**



**Porotherm 44 IZO
Profi**



**Porotherm 38 IZO
Profi**

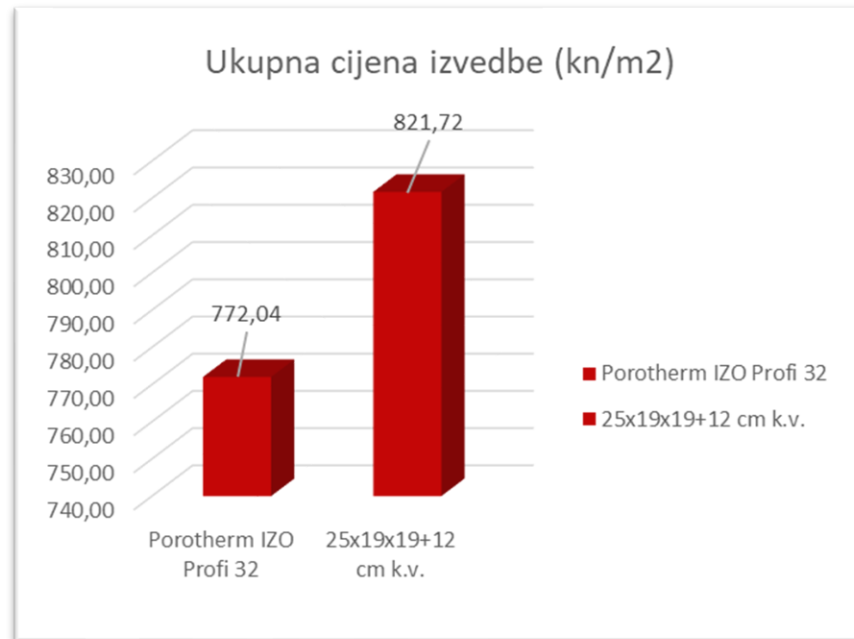
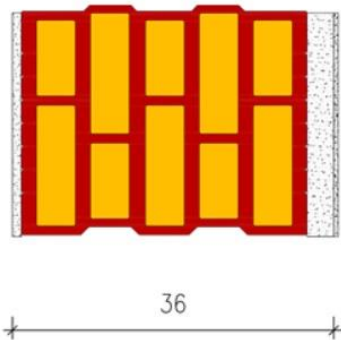
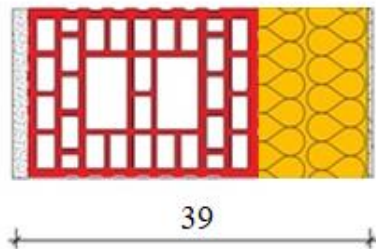
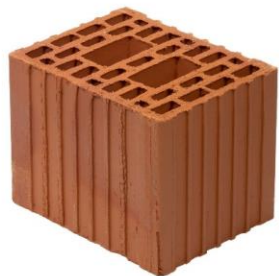


**Porotherm 32 IZO
Profi**



**Porotherm 25-38
IZO Profi**

Usporedna analiza cijena zidova $U=0,24 \text{ W/m}^2\text{K}$

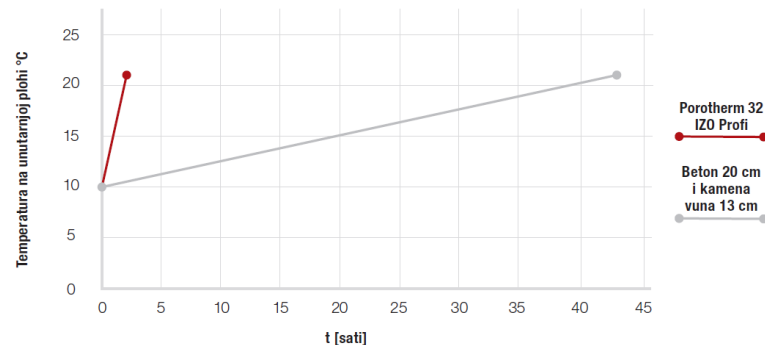
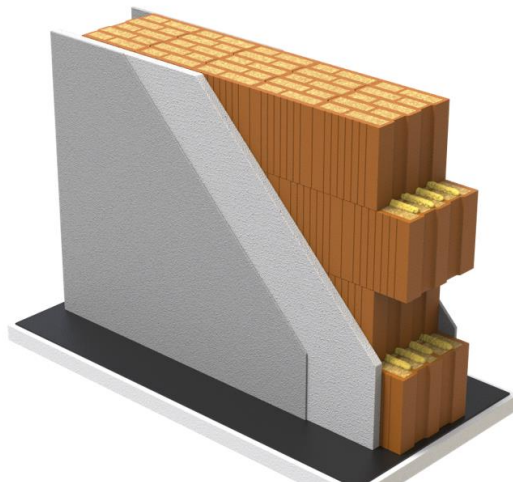
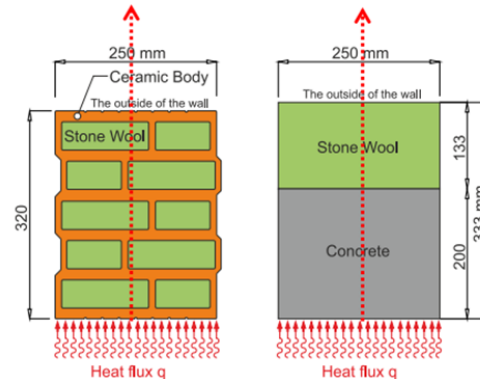


Izvor: Mjerenje i normiranje rada: Zidanje Wienerberger Porotherm 30 Profi, Građevinski fakultet, Sveučilište u Zagrebu, 2019.

Iznimne toplinske performanse i više prostora!

- » U-vrijednosti do $0,13 \text{ W/m}^2\text{K}$
- » Bez dodatnih slojeva izolacije
- » Tanji zidovi i dodatna korisna površina
- » Višestruke uštede energije

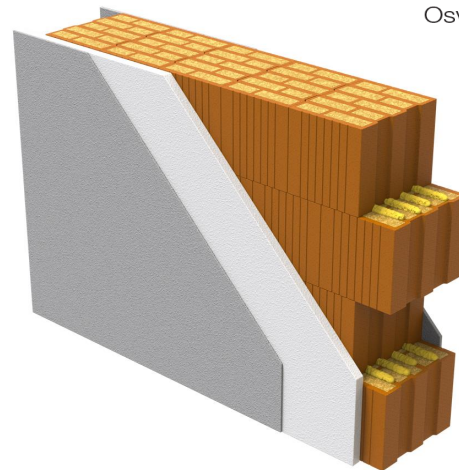
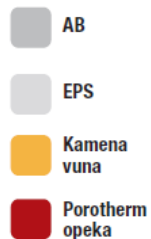
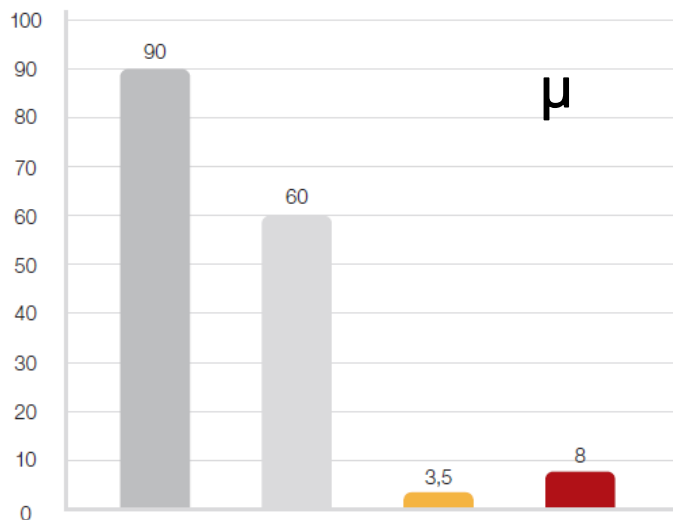
wienerberger
Building Solutions



Izvor: prof. dr. B. Trogrlić: Nestacionarni prolaz topline, Sveučilište u Splitu, Fakultet građevinarstva, arhitekture i geodezije

Difuzija vodene pare

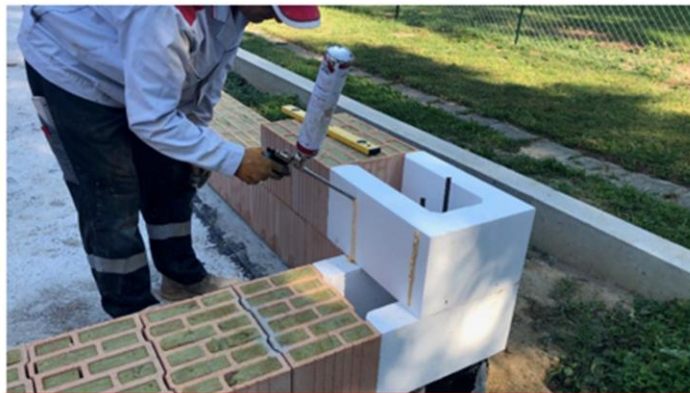
» Karakteristike materijala odgovorne za transport i pohranu vlage utječu, uz raspored slojeva, na razvoj relativne vlažnosti unutarnjeg zraka.



wienerberger
Building Solutions



Sistemska rješenja



Dryfix kutovi



Porotherm nadvoji



Kutovi od opeke

Sistemska rješenja

wienerberger
Building Solutions



Zvučna izolacija | Vrhunska zaštita od buke.

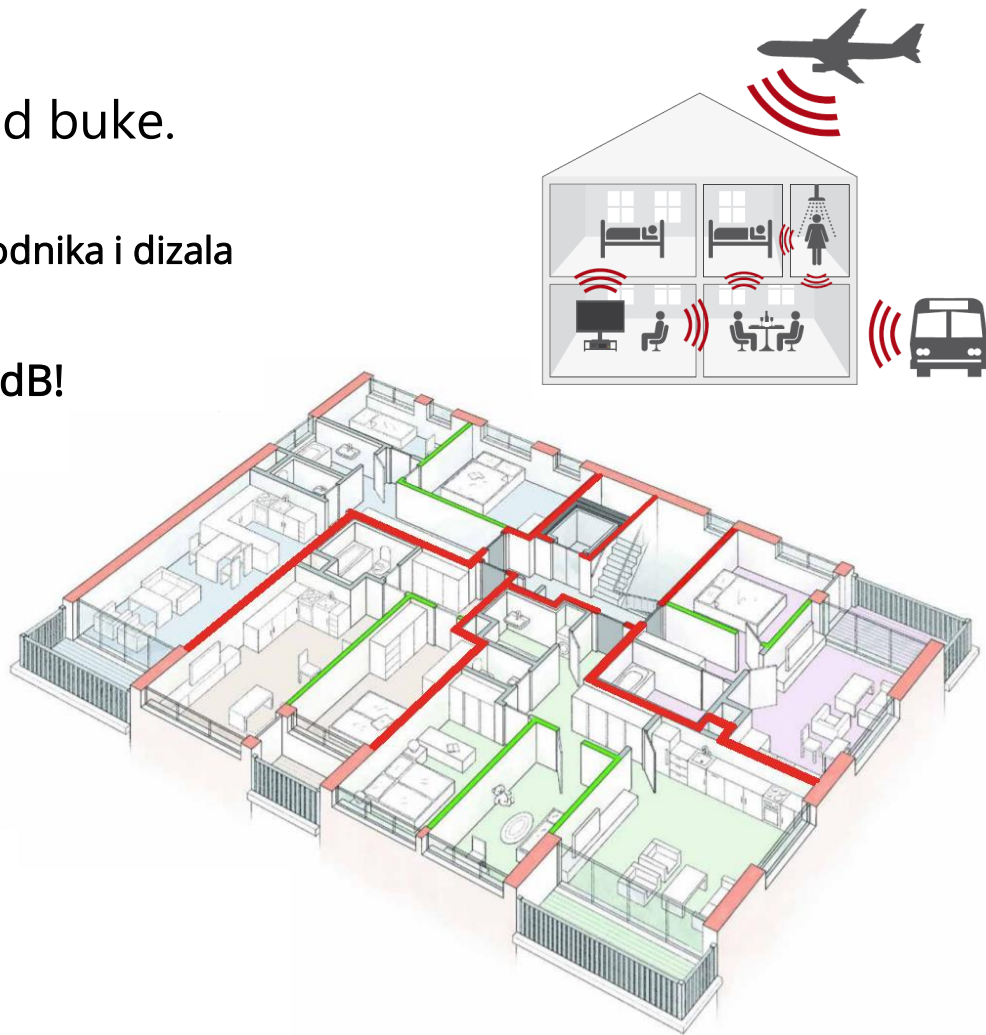
- > Rješenja za zvučne izolacije između stanova, hodnika i dizala
 - > Sustavi monolitnih i višeslojnih („sendvič”) ziđa
- > Porotherm 25 AKU / Zvučna izolativnost 54 dB!
 - > Izmjereno na ZAG Ljubljana



54 dB



52 dB



Tondach krovni sustavi

wienerberger
Building Solutions



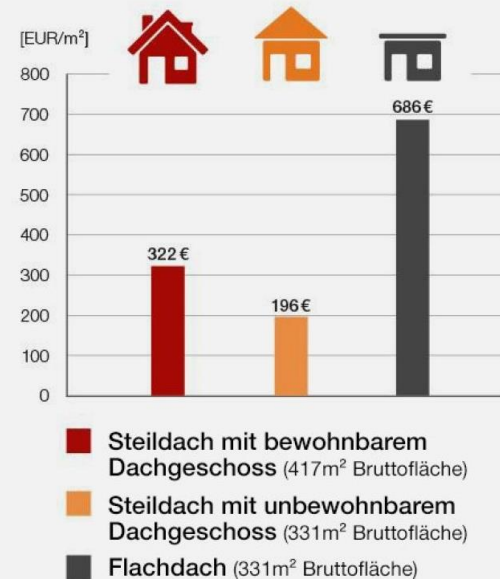
Zašto kosi krov?

- Niži troškovi izvedbe i održavanja
- Prirodno rješenje odvodnje oborinske vode s krova
- Dodana estetska i arhitektonska vrijednost objekta
- Dodatni prostor - mogućnost naknadnog uređivanja potkrovlja
- Kompaktniji objekt – veća toplinska učinkovitost



Vergleich der Lebenszyklus-Kosten

Unterschiedliche Dachtypen/m² Dachfläche



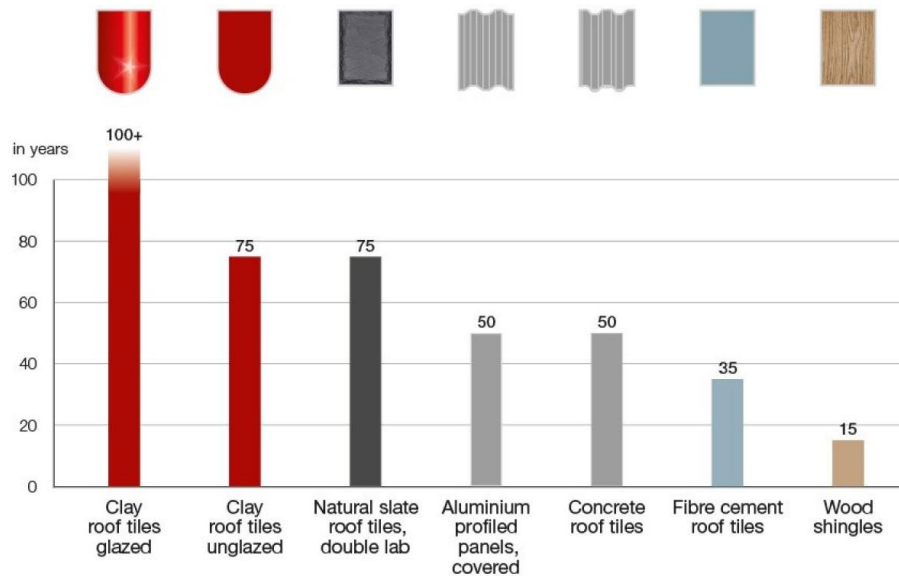
Source: Lebenszyklusanalyse Steildach,
Technical University Vienna 2015

Zašto glineni crijep?

- Prirodan, ekološki prihvatljiv materijal
- Trajan, izdržljiv i UV-postojan krov
- Nema potrebe za održavanjem - osigurana visoka kvaliteta življenja
- Arhitektonske mogućnosti – proizvodnja u širokoj paleti boja
- Jednostavna izvedba sanacije krova



Lifespan comparison of roofing materials



Source: SBR, Levensduur van bouwproducten, Netherlands 2011



MODERN line



RETRO line



MEDITERRANEAN line



CONTINENTAL line



Saturn



Figaro



Plan 18



Plan 30



Biber



Utoreni biber



Jupiter



Kontinental Plus



Venera



Mediteran Plus



MODERN line

Tondach Planoton 10

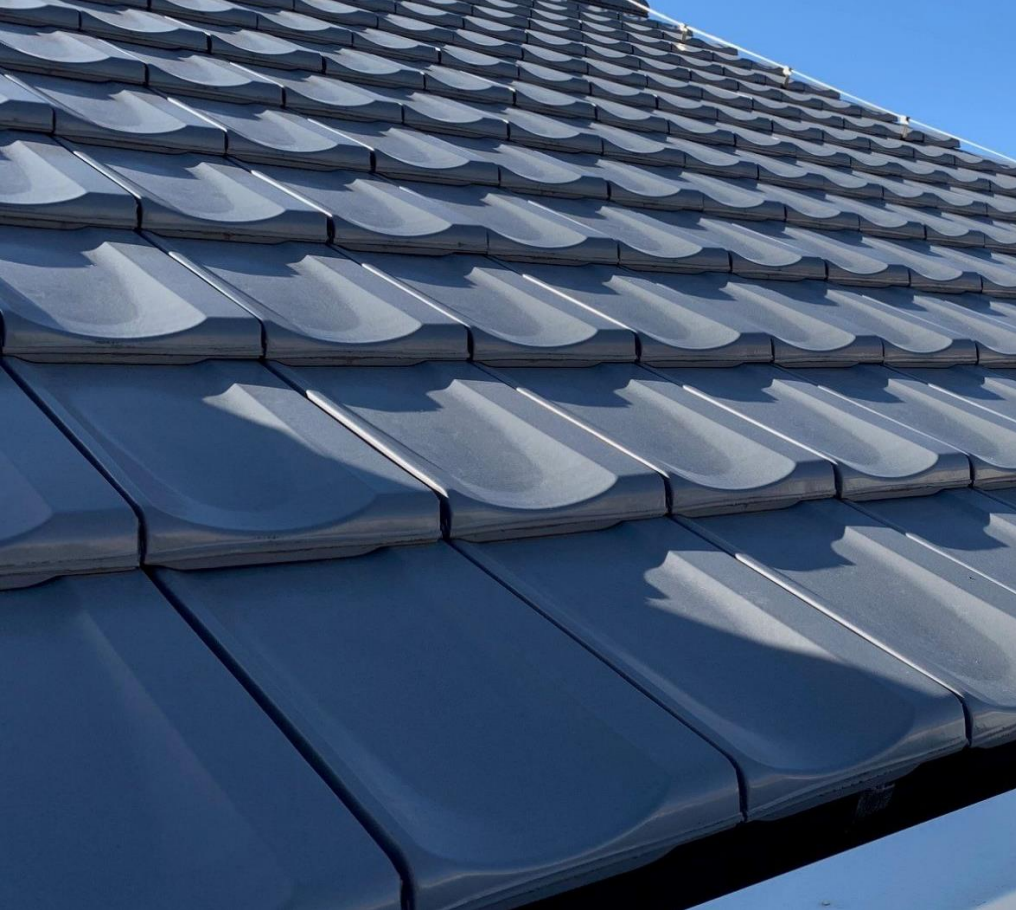

Wienerberger



Tondach Saturn

MODERN line


Wienerberger



- Ušteda na drvenim letvama (20% manje)
- Brzina pokrivanja (do 40% brže)
- Mogućnost pokrivanja na blagim nagibima (do 50% blaži nagib)
- Izuzetna otpornost na smrzavanje (ispitao institut IGH)
- Mogućnost ugradnje kopči za vjetar
- Moderno rješenje s minimalističkim izgledom krova
- Veći stupanj refleksije sunčevog zračenja (kod bijele boje)
- Kompletno sistemsko rješenje za pokrivanje krova



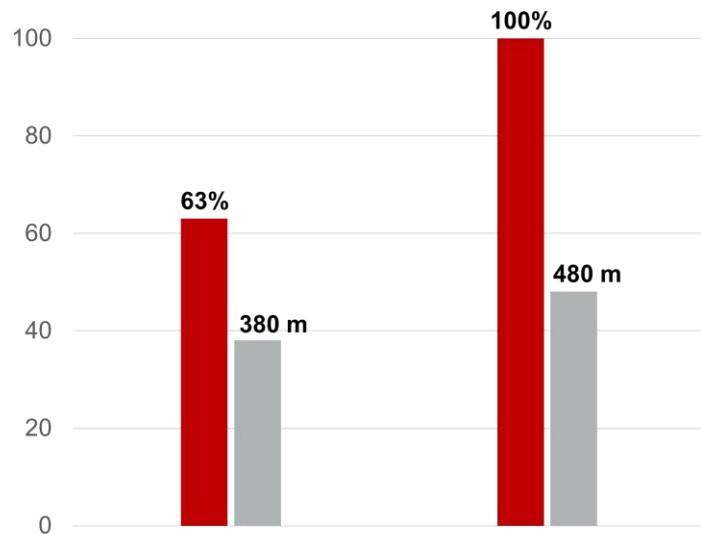
Tondach Saturn

MODERN line


Wienerberger

Saturn vs Kontinental Plus

dvostrešni krov (10 m x 7.5 m x 2)



■ Vrijeme potrebno za ugradnju ■ Metara letvi 4x5 cm



	Saturn	Kontinental Plus
Dimenzije (cm)	29,0 x 48,5	24,5 x 41,8 cm
Masa (kg)	4,0	2,9
Komada po m ²	10	15,5
Masa pokrova po m ² (kg)	40	45
Letvanje (cm)	38 - 42,5	29 - 35
Minimalni nagib	13°* (10°)**	22°* (20°)**

*uz korištenje Fol S paropropusne krovne folije

**uz korištenje Thermo DT paropropusne krovne folije



Tondach Saturn

Wienerberger





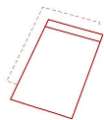


Tondach FOL Thermo DT

- › Čuva konstrukciju krova i produžuje njen životni vijek
- › Omogućuje dodatnu sigurnost od prodora vode
- › Osigurava prolazak vodene pare iz unutarnjeg prostora u okolinu
- › Vatrootporna s velikim intervalom temperaturne postojanosti (od -40°C do +120°C)
- › Otporna na oštećenja i istežanja
- › Vodootporne za nagibe krova i do 10°
- › **20 godina jamstva!**



Tondach Modern line



Moderan, minimalistički dizajn



Veliki format
Blagi nagibi krova već od 10°



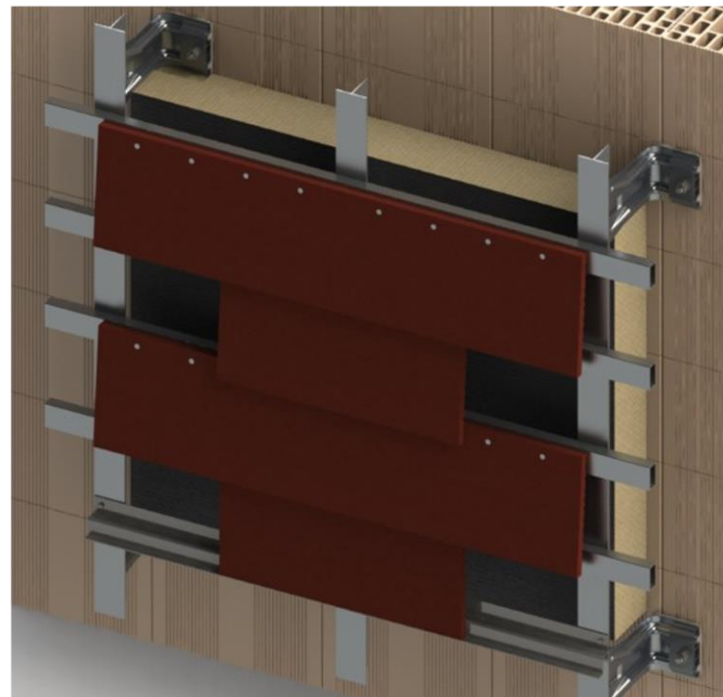
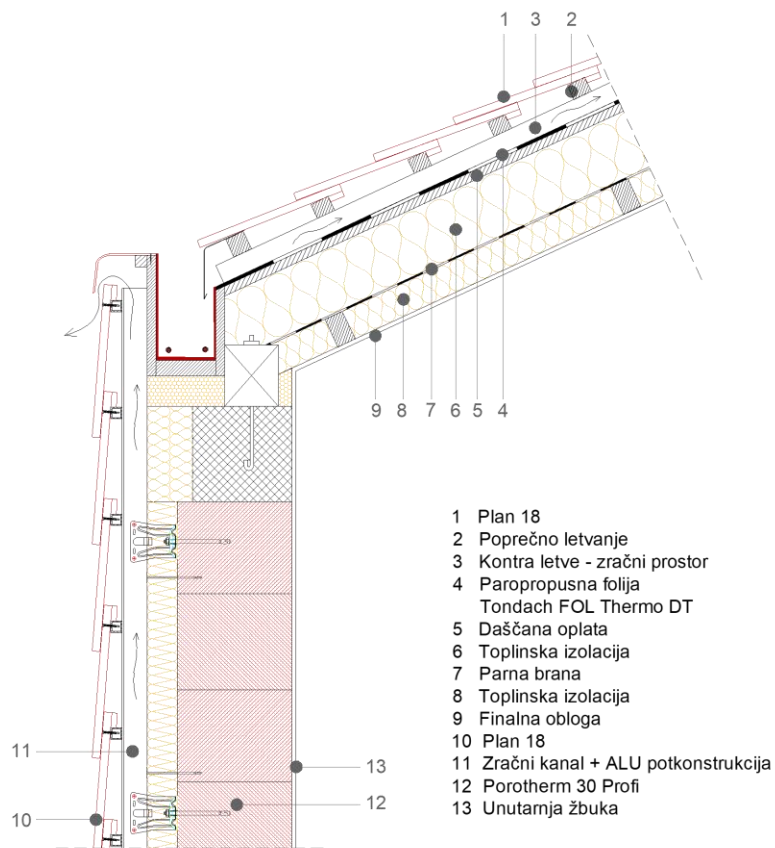
Primjena na kompletnoj ovojnici







Tondach ventilirana fasada – aluminij

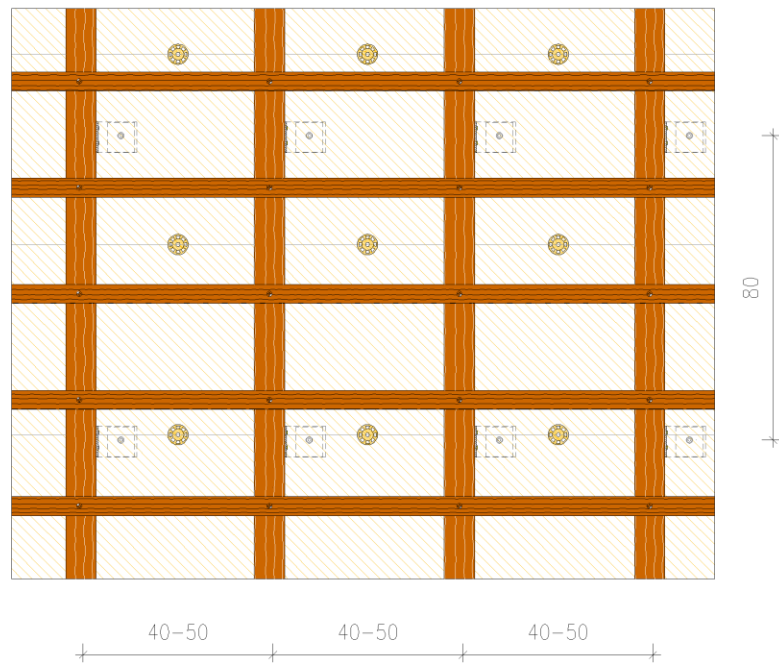
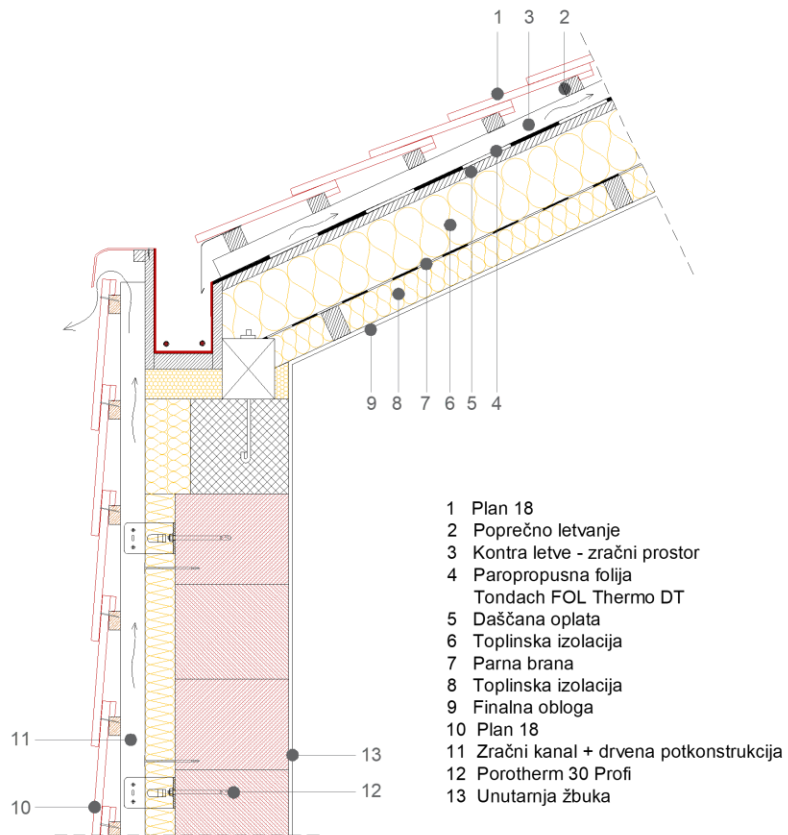


Tondach ventilirana fasada – aluminij

wienerberger
Building Solutions



Tondach ventilirana fasada – drvo



Tondach ventilirana fasada – drvo

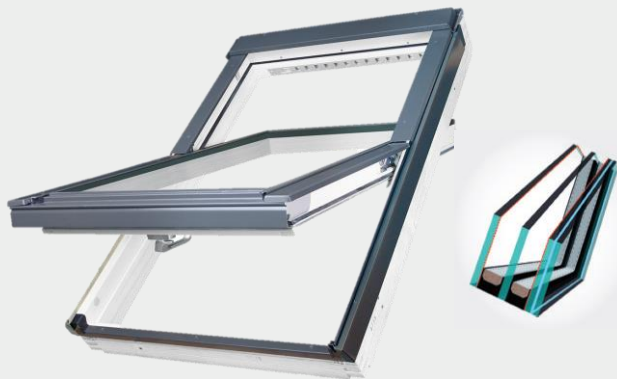
wienerberger
Building Solutions







Tondach krovni prozori



- » Tondach sistemsko rješenje
- » Više prirodne svjetlosti
- » Neprestano prozračivanje doma
- » Zdravija klima unutar prostora
- » Visoka kvaliteta i funkcionalnost



TONDACH
10
GODINA
NA PROZOR
JAMSTVA

TONDACH
20
GODINA
NA STAKLO
JAMSTVA

TONDACH
33
GODINA
NA CRJEP
JAMSTVA

Terca fasadni sustavi

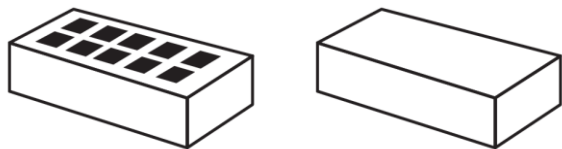
wienerberger
Building Solutions



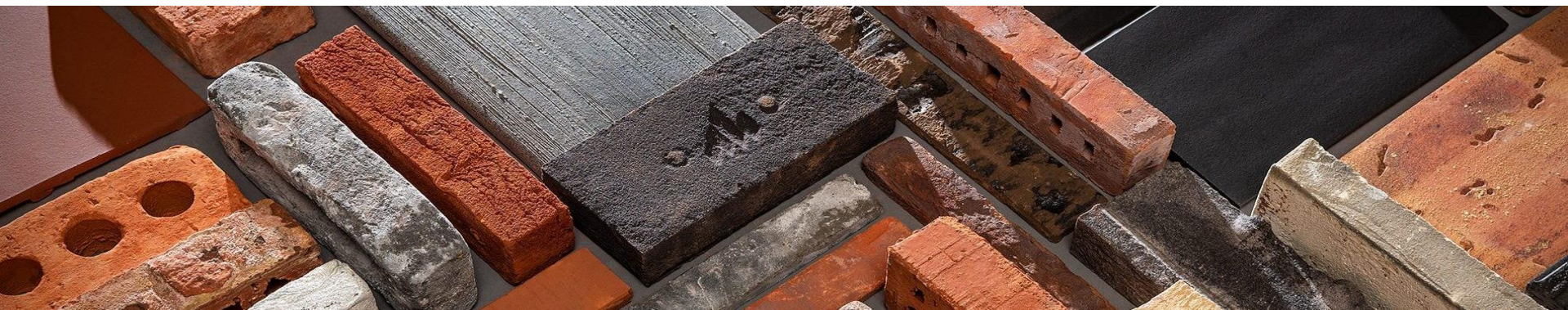
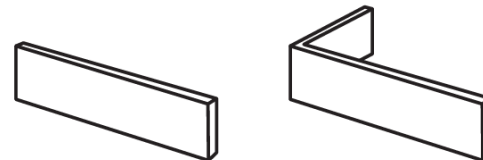
Terca | Kreativna fasadna rješenja.

wienerberger
we are wienerberger

Terca puna fasadna opeka



Terca Slip opeka



Terca puna fasadna opeka



Dimenzije (d x š x v) **240 x 115 x 71 // 215 x 102 x 65 mm**

Broj kom/m²: **48 // 58**

Težina kg/m²: **144 – 200**

Terca Slip opeka













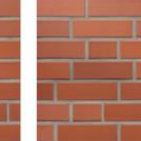































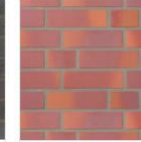





Dimenzije (d x š x v) **215 x 22 x 65 mm**

Broj kom/m²: **58**

Težina kg/m²: **30**

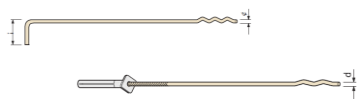
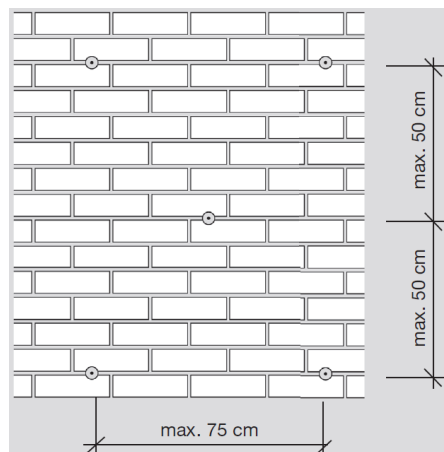
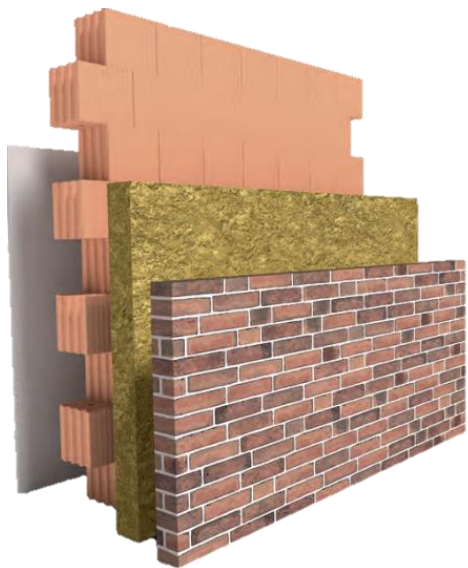
Terca | Širok spektar boja

wienerberger
we are wienerberger

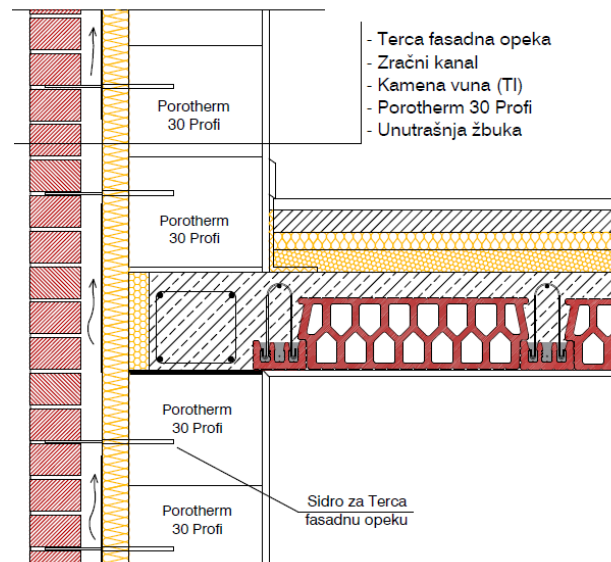
											
Abote puna opeka	Agora agaatgrijs puna opeka	Agora grafietswart puna opeka	Agora superwit puna opeka	Agora wit ivoor puna opeka	Ambiente Vulkangrau siva / ...	Frankfurt antracitno plava...	Havelland prirodno šareno žuta, nara...	Havelland prirodno šareno žuta, nara...	Heide crveno nijansirana / glat...	Heide crveno nijansirana / glat...	Kastanjebruin puna opeka
											
Ambiente Vulkangrau siva / ...	Barok '83 puna opeka	Barok '83 slip opeka	Belle Epoque de namur puna opeka	Burgenland žuta, narančaste nijans...	Burgenland žuta, narančaste nijans...	Lausitz šareno smeđa / glatka p...	Lausitz šareno smeđa / glatka sa...	Linaqua fumo puna opeka	Linaqua viola puna opeka	Luneburg crveno, smeđa, nijansiran...	Luneburg crveno, smeđa, nijansiran...
											
Calau smeđe crvena, modрно si...	Calau smeđe crvena, sive nijan...	Dolfino puna opeka	Dorado puna opeka	Dresden antracitno smeđa / glatka p...	Dresden antracitno smeđa / glatka sa...	Potsdam Rustikal smeđa s ljubičast...	Potsdam Rustikal smeđa s ljubičast...	Metropolis urbis bruin puna opeka	Metropolis vesta zwart puna opeka	Morado puna opeka	Oderland crvena, plave nijanse, svij...
											
Eibland sivo smeđa / rustikalna puna	Eibland sivo smeđa / rustikalna sa šu...	Forum cromo genuanceerd pun...	Forum ombra puna opeka	Forum pampas puna opeka	Frankfurt antracitno plava...	Oderland crvena, plave nijanse, svij...	Oud damme puna opeka	Oud ieper puna opeka	Oud kempisch puna opeka	Oud laethem puna opeka	Oud leerne puna opeka

Terca fasadni sustav | Detalj izvođenja

- > Ventilirana fasada / Dvoslojno „sendvič“ zide
- > Ugradnja nehrđajućih sidara u odgovarajućem rasteru
 - > 5 – 7 kom/m²

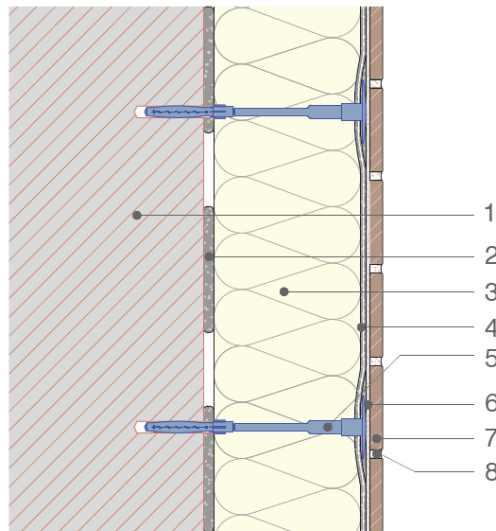


wienerberger
we are wienerberger

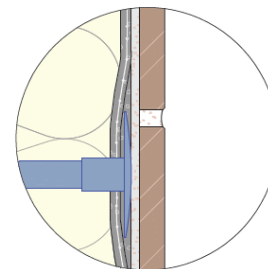


Terca Slip opeka | Detalj izvođenja

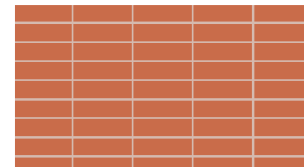
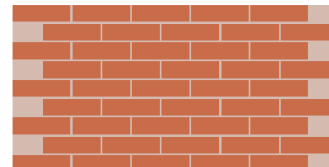
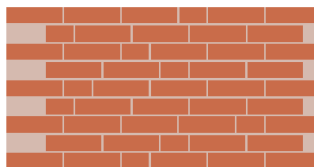
- > Ugradnja na sustav toplinske izolacije
- > Način slaganja i raspored (zidarski vez)



wienerberger
we are wienerberger

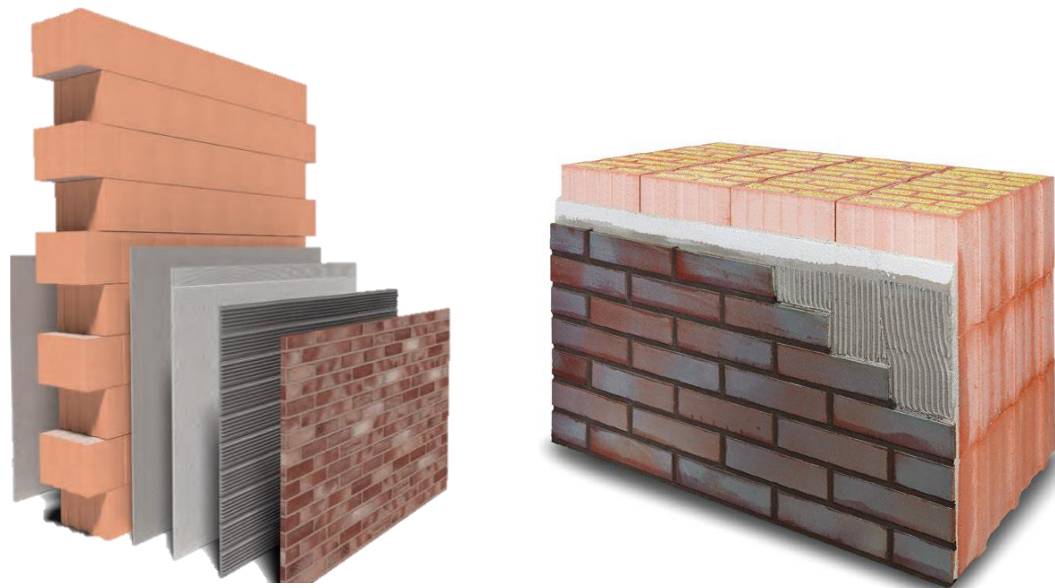


- 1 Porotherm Profi (nosivi zid)
- 2 Mort za lijepljenje
- 3 Fasadna izolacijska ploča (do 300 mm)
- 4 Armaturni sloj (ND 5 mm)
- 5 Sustavna pričvrsnica
- 6 Ljepilo za obloge
- 7 Terca Slip opeka
- 8 Prikladna masa za fugiranje

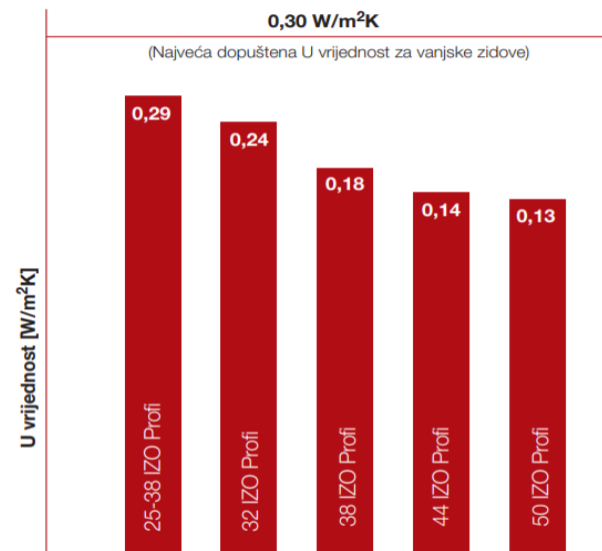


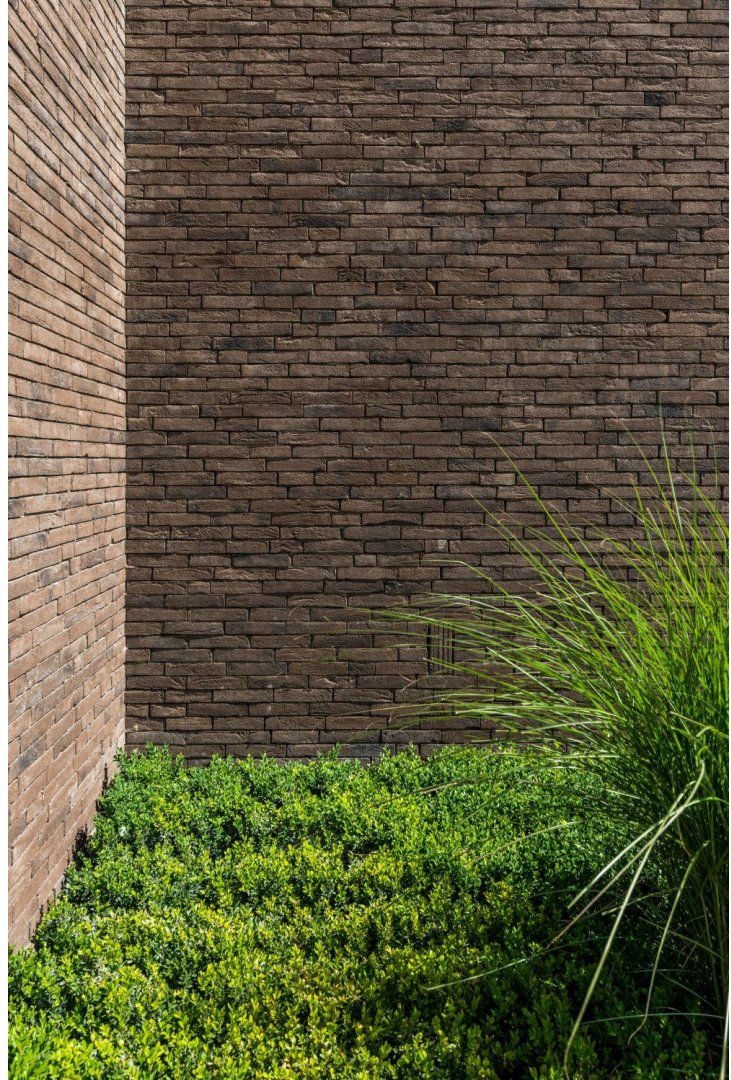
Terca Slip opeka | Detalj izvođenja

> Zid od [Porotherm IZO Profi](#) opeke



U vrijednosti / neožbukani zid



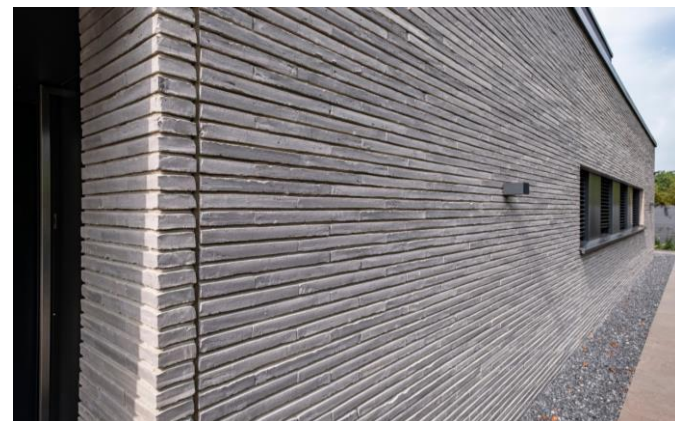






Terca | Referentni objekti

wienerberger
we are wienerberger





ger
erger







Hvala na pažnji!

Josip Klarić, mag. ing. aedif.
Projektno-tehnički savjetnik – Wienerberger Hrvatska
josip.klaric@wienerberger.com

wienerberger